

## WHAT IS CLAIMED IS:

- 343 A<sup>27</sup>
1. An encoder for encoding a digital baseband signal in a spread spectrum communication system, said encoder comprising:
- 5 an exclusive "or" logic unit having a first input for receiving said digital baseband signal;
- a one bit delay unit having an input coupled to the output of said exclusive "or" logic unit, said one bit delay unit having an output coupled to a second input of said exclusive "or" logic unit;
- 10 the output of said exclusive "or" logic unit providing an encoded digital baseband signal;
- said encoded digital baseband signal coupled to a modulator so as to modulate spread spectrum carrier signal.
- 15 2. An encoder according to claim 1 wherein said spread spectrum communication system is a geometric harmonic modulation communication system.
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- 20 3. A decoder for decoding a digital baseband signal recovered from a geometric harmonic modulation spread spectrum communication signal said decoder comprising:
- a one bit delay unit having an input coupled to the output of a geometric harmonic modulation Fourier transform unit;
- a multiplier having a first input coupled to the output of said geometric harmonic modulation Fourier transform unit, and a
- 25 second input coupled to the output of said one bit delay unit;
- a summer coupled to the output of said multiplier;
- a logic level determiner coupled to the output of said multiplier said logic level determiner to provide a decoded digital
- 30 baseband signal.
4. A coder for a geometric harmonic modulation spread spectrum communication system, said coder comprising:
- an encoder including:
- 35 an exclusive "or" logic unit having a first input for receiving a baseband digital signal;

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a one bit delay unit having an input coupled to the output of said exclusive "or" logic unit;

said one bit delay unit having an output coupled to a second input of said exclusive "or" logic unit;

5 the output of said exclusive "or" logic unit providing an encoded digital baseband signal;

said encoded digital baseband signal modulating a spread spectrum carrier signal;

a decoder including:

10 a one bit delay unit having an input coupled to the output of a geometric harmonic modulation Fourier transform unit;

a multiplier having a first input coupled to the output of said geometric harmonic modulation Fourier transform unit, and a second input coupled to the output of said one bit delay unit;

15 a summer coupled to the output of said multiplier;

a logic level determiner coupled to the output of said summer said logic level determiner providing a decoded digital baseband signal at its output.

20 5. A coder according to claim 4 wherein the modulated spread spectrum carrier signal is coupled to a power line and wherein said power line is utilized to convey said encoded baseband signal information from said encoder to a receiver.

25 *Supp 11* 6. A method for encoding a digital baseband signal in a spread spectrum communications system, the method comprising the steps of:

providing said digital baseband signal to a first input of an exclusive "or" unit;

30 performing an exclusive "or" operation on said first input and a second input of said exclusive "or" unit;

delaying the output of said exclusive "or" unit and providing the delayed output to said second input of said exclusive "or" unit;

the undelayed output of said exclusive "or" unit being the encoded digital baseband signal.

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5 7. The method of claim 6 further comprising the step of utilizing the encoded digital baseband output to modulate a spread spectrum carrier signal.

10 8. The method of claim 6 wherein the output of said exclusive "or" unit is delayed for one bit period.

9. The method of claim 7 wherein said modulated spread spectrum carrier is coupled to a power line.

15 10. A method of decoding a digital baseband signal encoded by the method of claim 6, when the encoded digital baseband signal modulates a geometric harmonic modulation carrier signal, the method comprising the steps of:

decomposing said geometric harmonic modulation signal into geometric harmonic modulation tones;

20 providing said geometric harmonic modulation tones to a first input of a multiplier;

delaying said geometric harmonic modulation tones and providing the delayed tones to a second input of said multiplier;

25 multiplying said first input by said second input to provide a product;

summing said product;

determining the logic level of said product, the determined logic level being the decoded digital baseband signal.

30 11. A method in accordance with Claim 10 further comprising the steps of:

declaring a logical zero when said product is greater than or equal to zero, and

otherwise declaring a logical one.